Commonwealth of Kentucky
Division for Air Quality

PERMIT STATEMENT OF BASIS

FEDERALLY ENFORCEABLE CONDITIONAL MAJOR DRAFT PERMIT
NO. F-05-027
INTERPLASTIC MANUFACTURING COMPANY
FORT WRIGHT, KENTUCKY
NOVEMBER 15, 2005
JOSHUA J. HIGGINS, REVIEWER

SOURCE I.D. #: 21-117-00086
SOURCE A.I. #: 2466
ACTIVITY #: APE20050001

SOURCE DESCRIPTION:
Interplastic Manufacturing Company (Interplastic) operates a synthetic resin manufacturing facility in Kenton County, Kentucky. Raw materials, either charged from powder handling systems or from various raw material storage tanks (SEU 8, 13, 14, 15, 16, 20, 21, 22, 23, 24, 27, 28, 36, 40, 41, and 43), are processed in three reactor vessels, or Process Kettles (PK#1 (SEU 57), PK#2 (SEU 58), and PK#3 (SEU 101)), to produce an alkyd. The reactions can take place at both atmospheric and/or elevated pressures, and can take from 12 to 48 hours. The reactors can be heated with hot oil from any one of three sources (SEU 10, 33, and 102, as required), and are typically supplied with inert gas from the Inert Gas Generator (SEU 109). While still hot, the alkyd is transferred into one of six Thinning Kettles (TK#1 or #2 for PK#1, TK#3 or #4 for PK#2, and TK#5 or #6 for PK#3), and thinned with styrene (one product is thinned with acetone, but acetone is neither a VOC or a HAP). Once thinned, the product is considered a "base resin" which is either sold "as is" or further blended to customer specifications. Approximately 30% of the resin is sold "as is," while the remaining 70% is either stored on site in Resin Storage Tanks (SEU 4, 5, 19, 45, 106, and 107) or further blended in one of numerous blend tanks (SEU 11, 12, 17, 18, 29, 30, 34, 35, 37, 44, 48, 55, 104, 105, 110, 111, 112, 113, 115, or 116). Finally, the resin is packaged in one of two tank truck loading areas (SEU 39 or 119), one of two Automatic Drumming Stations (SEU 117 or 118), or one of three dual-purpose small loading areas (SEU 44, 115, or 116).

Although numerous construction and operating permits and "no permit required" letters were issued in the past, the source has never received a source-wide operating permit. Interplastic was initially on the Division's original list of Title V sources, and submitted a Title V application on December 16, 1998. After numerous Notices of Deficiency (NOD's) issued based on the Title V application, and as a result of a court-ordered consent decree, Interplastic submitted a completely revised and updated application on February 15, 2005. The revised application requested operating and emission limits, and Conditional Major source status covered under 401 KAR 52:030.

CREDIBLE EVIDENCE:
This permit contains provisions which require that specific test methods, monitoring or recordkeeping be used as a demonstration of compliance with permit limits. On February 24, 1997, the U.S. EPA promulgated revisions to the following federal regulations: 40 CFR Part 51, Sec. 51.212; 40 CFR Part 52, Sec. 52.12; 40 CFR Part 52, Sec. 52.30; 40 CFR Part 60, Sec. 60.11 and 40 CFR Part 61, Sec. 61.12, that allow the use of credible evidence to establish compliance with applicable requirements. At the issuance of this permit, Kentucky has only adopted the provisions of 40 CFR Part 60, Sec. 60.11 and 40 CFR Part 61, Sec. 61.12 into its air quality regulations.

COMMENTS:

Type of control and efficiency:

Primary VOC Control: -- (103) "New" Thermal Oxidizer
Manufacturer: John Zink
Model: SO# 901078
Description: Single chamber, 30 mmBtu/hr
Destruction Efficiency: 99.2%
Fuel: Natural Gas – primary, Propane – auxiliary
Date constructed: 1996

Secondary VOC Control: -- (26) "Old" Thermal Oxidizer
Manufacturer: John Zink
Model: SO# X43231
Description: Single chamber, 2 mmBtu/hr
Destruction Efficiency: 98.4%
Fuel: Natural Gas – primary, Propane – auxiliary
Date constructed: 1980

PM Control: -- (132) 111A Baghouse
Manufacturer: Chicago Conveyor Corp.
Model: 440R-28-45
Description: Bin vent baghouse w/ rev. nitrogen pulse-jet
Destruction Efficiency: 95% (Assumed)
Date constructed: 2005

-- (133) 211C Cartridge Filter
Manufacturer: Chicago Conveyor Corp.
Model: 440-36-50
Description: Cartridge housing w/ rev. nitrogen pulse-jet
Destruction Efficiency: 95% (Assumed)
Date constructed: 2005

Emission factors and their source:

1. Process Kettles.

PM: AP-42, Table 6.4-1. The *Paint & Varnish* section of *Chapter 6 – Organic Chemical Process Industry* indicates that up to 1% of PM emissions can be expected from handling dry pigments as they are added in manufacturing paint. Interplastic does not manufacture paint, but its material handling of powdered raw materials is similar. Therefore, 1% is a good estimate of uncontrolled PM emissions from adding powdered raw materials to the PK's. Additionally, this section of AP-42 indicates that 90% PM control can be expected from a thermal oxidizer. This control efficiency was used in calculating potential PM emissions from adding powdered raw materials to the reactors instead of the 98.4% control efficiency utilized in the application because no information was found indicating that the thermal oxidizers have ever been tested with regard to PM emissions.

VOC: EPA 450/4-90-003, *Airs Facility Subsystem Source Classification Codes and Emission*

Factor Listing for Criteria Air Pollutants, March 1990, p. 43.

HAP: VOC emission factor multiplied by the percentage of specific HAP raw material inputs.

2. Thinning Kettles.
   VOC: EPA 450/4-90-003, *Airs Facility Subsystem Source Classification Codes and Emission Factor Listing for Criteria Air Pollutants*, March 1990, p. 43.
   HAP: 100% of the VOC emission factor since styrene is used as the thinning agent.
3. Resin Blending Tanks.
   VOC & HAP: EPA 450/R-94-020, *Alternative Control Techniques Information Document: Control of Volatile Organic Compound Emissions from Batch Processes*, February 1994, pp. 3.8 – 3.14.
4. Packaging Processes.
   VOC: Summation of HAP emission factors.
   HAP: AP-42, Chapter 5.2, Equation 1 for each blending material multiplied by the facility-wide use of that material in blending operations.
5. Resin & Raw Material Storage Tanks.
   VOC & HAP: The emissions for all the storage vessels are based on U.S. EPA's TANKS 4.0 program.
6. Combustion Equipment.
   All Pollutants: AP-42, Chapter 1.4 for natural gas combustion, and Chapter 1.5 for LPG combustion.
7. Bulk Powder Handling System.
   PM: AP-42, Table 6.4-1, from the *Paint & Varnish* section of *Chapter 6 – Organic Chemical Process Industry*. The uncontrolled emission factor of 1% PM (or 20 lbs of PM per ton of powdered material handled) was also applied to the Bulk Powder Handling System processes. Additionally, the source assumed a conservative 95% PM control efficiency for the bin vent filter and cartridge filter associated with these processes instead of the manufacturer's stated efficiency of over 99%.

Applicable regulations:

401 KAR 50:012, *General application*, applies to each process unit which emits VOC's.

401 KAR 50:055, *General compliance requirements*, applies to the Bulk Powder Handling System and use of the Bin Vent and Cartridge filter.

401 KAR 59:010, *New process operations*, applies to the PM emissions from PK#2, PK#3, the High Shear Blender, and the bulk powder handling system equipment.

401 KAR 59:015, *New indirect heat exchangers*, applies to all of the combustion equipment except the "Old" John Zink Thermal Oxidizer which does not meet the "affected facility" definition.

401 KAR 61:020, *Existing process operations*, applies to the PM emissions from PK#1.

401 KAR 63:020, *Potentially hazardous matter or toxic substances*, applies to each process unit which emits or may emit potentially hazardous matter or toxic substances.

Anything unusual about the:

1. 401 KAR 63:021 Applicability and Requirements.

Interplastic was issued permit number S-95-115 on June 15, 1995, which contained limitations on styrene emissions based on the version of 401 KAR 63:022 with an effective date of November 11, 1986. This regulation was repealed effective January 19, 1999. That same day, 401 KAR 63:021 was revised, and currently states that existing sources which were issued a permit pursuant to 401 KAR 50:035 with conditions based on the previous version of 401 KAR 63:021 or 401 KAR 63:022 shall continue to comply with those requirements unless the source can demonstrate that a condition is no longer necessary.

Through submittal of the revised application, Interplastic has shown that the S-95-115 limitation for styrene (i.e.: 98.9 lb/hr, which equals 433.2 tpy) is "…no longer necessary to protect human health and the environment." [401 KAR 63:021, Section 1] This is due to the fact that the uncontrolled source-wide emissions of styrene are only 19.52 lb/hr and 89.7 tpy (controlled styrene emissions are only about 1.36 lb/hr and 5.94 tpy). Since the source's uncontrolled maximum potential emissions of styrene are already well below the S-95-115 limit, carrying the limit over to this permit will not provide any protection to human health or the environment, and, therefore, is no longer necessary. Additionally, the source-wide Conditional Major limit of 9 tons-per-year (tpy) of any single HAP is much more restrictive than the limit from S-95-115. Finally, SCREEN3 modeling indicates that emissions of styrene at or below the Conditional Major source-wide limits are not emitted "…in such quantities or duration as to be harmful to the health and welfare of humans, animals and plants." [401 KAR 63:020, Section 3]. See the SCREEN3 modeling discussion in Appendix A and B.

2. RACT Determination and Requirements.

Based on the facility's uncontrolled VOC PTE, Permit S-95-015, Revision 1 issued to Interplastic in November of 1997 included 401 KAR 50:012, *General application*, as a regulation applicable to every source of VOC at the facility. However, the only requirement in that permit was to submit a Reasonably Available Control Technology (RACT) analysis with their Title V application. All RACT determination submittals received prior to the February 15, 2005 updated application did not include an analysis of available control technology. A detailed analysis was critical since none of the "...Control Techniques Guidelines Document[s] issued by the U.S. EPA and promulgated in regulatory form by the cabinet..." [401 KAR 50:012, Section 1(a)1.] are applicable, and, as a result, non-CTG RACT is being applied.

Interplastic already has most of their VOC emitting sources hard-ducted to Thermal Oxidizers (one primary (DE = 99.2%) and one back up (DE = 98.4%)). The updated application includes a top-down analysis of available control devices, taking into account technological and economic feasibility, to show that the existing TO's should be used to fulfill the RACT requirement (See the table included below).

Control Technology	% Control	Emissions Rate (tpy) from ctrl'd sources	Capital Investment	Other Impacts

Thermal Oxidation	99.2	1.498	N/A – existing equipment	Back-up TO already on site
Caustic Scrubber	> 90*	3.745	Not Evaluated**	Option not feasible based on sewage permit restrictions.
Carbon Adsorption	95 – 98*	18.724	***	

* Generic control efficiencies from APTI 482, *Sources and Control of Volatile Organic Air Pollutants*, 3rd ed., November 2002.
** This is not a feasible option due to other permit constraints, so capital investment not researched.
*** According to Interplastic, the vendor contacted could not provide an exact quote for costs of Carbon Adsorption. However, the vendor told them that Carbon Adsorption would be many times more expensive than Thermal Oxidizers.

Additionally, a search of the U.S. EPA's RACT/BACT/LAER (RBL) Clearinghouse found only one RACT determination for a resin manufacturing process:

RBLC ID: CT-0124
Company: Raymark Corp., Inc.
Process: Resin Manufacture
Date: 02/10/1987
Add on control: Boiler
% Efficiency: 90%
Basis: RACT

Since both the top-down analysis and the RBL Clearinghouse seem to support some type of incineration, use of the existing Thermal Oxidizers for those points already ducted to them, and a source-wide VOC reduction of 90% of the uncontrolled potential is included as RACT. See Sections B, D, and E of the permit.

3. Non-applicable Regulations.

401 KAR 57:002, *40 CFR Part 61 national emission standards for hazardous air pollutants*, incorporating by reference 40 CFR 61.240 to 61.247 (Subpart V), *National Emission Standard for Equipment Leaks (Fugitive Emission Sources)*, does not apply because the source is not subject to any other Part 61 rules.

401 KAR 59:050, *New storage vessels for petroleum liquids*; 401 KAR 60:005, *40 CFR Part 60 standards of performance for new stationary sources*, incorporating by reference 40 CFR 60.110 to 60.113 (Subpart K), *Standards of performance for storage vessels for petroleum liquids for which construction, reconstruction, or modification commended after June 11, 1973 and prior to May 19, 1978*, and 40 CFR 60.110a to 60.115a (Subpart Ka), *Standards of performance for storage vessels for petroleum liquids for which construction, reconstruction,*

or modification commended after May 18, 1978 and prior to July 23, 1984; and 401 KAR 61:050, *Existing storage vessels for petroleum liquids*, do not apply to any of the resin or raw

material storage tanks because they do not store “petroleum liquid” as defined in those regulations.

401 KAR 60:005, *40 CFR Part 60 standards of performance for new stationary sources*, incorporating by reference 40 CFR 60.110b to 60.117b (Subpart Kb), *Standards of performance for volatile organic liquid storage vessels (including petroleum liquid storage vessels) for which construction, reconstruction, or modification commended after July 23, 1984*, does not apply to any of the resin or raw material storage tanks because of either one or a combination of the following: tank size, tank construction date, tank content (i.e.: not VOL), maximum TVP of tank contents, and pressurized tanks with no emissions.

401 KAR 60:005, *40 CFR Part 60 standards of performance for new stationary sources*, incorporating by reference 40 CFR 60.480 to 60.489 (Subpart VV), *Standards of performance for equipment leaks of VOC in the synthetic organic chemicals manufacturing industry*, does not apply to the source because they do not produce a product or intermediate as listed in 40 CFR 60.489.

401 KAR 60:005, *40 CFR Part 60 standards of performance for new stationary sources*, incorporating by reference 40 CFR 60.700 to 60.708 (Subpart RRR), *Standards of performance for volatile organic compound emissions from synthetic organic chemical manufacturing industry (SOCMI) reactor processes*, does not apply to the source because the Process Kettles are batch operations and the source does not produce products listed in 40 CFR 60.707.

401 KAR 61:175, *Leaks from existing synthetic organic chemical and polymer manufacturing equipment*, does not apply to the source because the source is not a “synthetic organic chemical manufacturing plant” or a “polymer manufacturing plant” as defined in the regulation.

401 KAR 63:002, *40 CFR Part 63 national emission standards for hazardous air pollutants*, incorporating by reference 40 CFR 63.100 to 63.107 (Subpart F), N*ational emission standards for hazardous air pollutants from the synthetic organic chemical manufacturing industry*, does not apply to the source because they do not manufacture as a primary product any material listed in Subpart F, Table 1, and because this facility is not a “major source” of HAP emissions.

401 KAR 63:002, *40 CFR Part 63 national emission standards for hazardous air pollutants*, incorporating by reference 40 CFR 63.480 to 63.507 (Subpart U), N*ational emission standards for hazardous air pollutant emissions: group 1 polymers and resins*, does not apply to the source because they do not manufacture “elastomer product” as defined in 40 CFR 63.482, and because this facility is not a “major source” of HAP emissions.

401 KAR 63:002, *40 CFR Part 63 national emission standards for hazardous air pollutants*, incorporating by reference 40 CFR 63.520 to 63.529 (Subpart W), N*ational emission*

standards for hazardous air pollutants for epoxy resins production and non-nylon polyamides production, does not apply to the source because they do not manufacture “basic liquid epoxy resin” or “wet strength resin” as defined in 40 CFR 63.522, and because this

facility is not a "major source" of HAP emissions.

401 KAR 63:002, *40 CFR Part 63 national emission standards for hazardous air pollutants*, incorporating by reference 40 CFR 63.1310 to 63.1336 (Subpart JJJ), N*ational emission standards for hazardous air pollutant emissions: group IV polymers and resins*, does not apply to the source because they do not manufacture "thermoplastic product" as defined in 40 CFR 63.1312, and because this facility is not a "major source" of HAP emissions.

401 KAR 63:002, *40 CFR Part 63 national emission standards for hazardous air pollutants*, incorporating by reference 40 CFR 63.1400 to 63.1419 (Subpart OOO), N*ational emission standards for hazardous air pollutant emissions: manufacture of amino/phenolic resins*, does not apply to the source because they do not manufacture "amino/phenolic resin" as defined in 40 CFR 63.1402, and because this facility is not a "major source" of HAP emissions.

401 KAR 63:002, *40 CFR Part 63 national emission standards for hazardous air pollutants*, incorporating by reference 40 CFR 63.2430 to 63.2550 (Subpart FFFF), N*ational emission standards for hazardous air pollutants: miscellaneous organic chemical manufacturing*, does not apply to the source because this facility is not a "major source" of HAP emissions.

4. Pipeline Fugitive Requirements

Even though 40 CFR 60.480 to 60.489 (Subpart VV), *Standards of performance for equipment leaks of VOC in the synthetic organic chemicals manufacturing industry*, is not a directly applicable regulation, many of it's standards and requirements were listed in the permit as the Compliance Demonstration Method for applicable operating and emission limitations in order to ensure that the numerous connectors, valves, and pumps are being monitored and maintained properly. These requirements are deemed necessary because of the possibility that undiagnosed and unrepaired leaks could lead to compliance issues with the source-wide emission limits, the source-wide RACT requirement to reduce VOC emissions, and with 401 KAR 63:020. See Section B of the permit for the actual requirements.

EMISSION AND OPERATING CAPS DESCRIPTION:

Interplastic requested numerous voluntary operating and source-wide emission limits to keep emissions under major source thresholds and preclude the applicability of 401 KAR 52:020, *Title V permits*. See Section B of the permit for operating and emission limits pertaining to the individual emission points, and Section D of the permit for the requested source-wide emission limits.

401 KAR 50:012, *General application*, applies to the emissions of VOC's from the facility. As a result, a Reasonably Available Control Technology (RACT) analysis requires the use of the existing Thermal Oxidizers for those points already ducted to them, and a source-wide VOC reduction of 90% of the uncontrolled potential. See Section D of the permit, and the RACT determination discussed above.

PERIODIC MONITORING:

See the permit for Specific Monitoring Requirements, by group.

OPERATIONAL FLEXIBILITY:

Interplastic operates two thermal oxidizers – one primary (SEU 103) and one secondary (SEU 26). During normal operations, emissions are routed to the primary oxidizer almost 95% of the time (typically 49 out of 52 weeks of the year). Since the primary oxidizer has a better destruction efficiency than the secondary oxidizer, the emissions depicted above represent a worst-case hypothetical situation in that the secondary oxidizer's destruction efficiency was applied to all annual PTE calculations. Since these hypothetical worst-case emissions still show a very reasonable expectation of compliance with both the Conditional Major and RACT limits, the operating limitations in the permit provide for some flexibility in that they do not specify which oxidizer to use at any given time.

The Thermal Oxidizers are required to operate at 1400º F. As indicated on the DEP7007V forms in the application, this temperature is carried over from permit S-95-115, Revision 1, and, based on supplied MSDS data, is substantially higher than the ignition temperature of the chemicals used at this plant. Therefore, during a malfunction of the on-line thermal oxidizer, this permit continues use of that device for a short period of time while it is still hot, rather than immediately routing those vapors to the other device still in its warm-up period. Conversely, when there is a planned shutdown of the on-line oxidizer (i.e.: preventive maintenance), the switch-over is immediate. These provisions provide operating flexibility by coordinating the two thermal oxidizers and, even more importantly, result in maximum destruction of VOC's. See the Operating Limitations for the Thermal Oxidizers, and the "upset condition" provisions carried over from S-95-115, Revision1 in Section E of the permit.

Interplastic's application identifies liquefied propane gas (LPG) as a secondary fuel for all of their combustion equipment in case of periods of a natural gas utility curtailment. Since combustion of LPG in place of natural gas will still result in a very reasonable expectation of compliance with emission limits from 401 KAR 59:015 and with Conditional Major source-wide limits, the indirect heat exchanger operating limits allow either natural gas or LPG combustion at any time.

APPENDIX A

SCREEN3 MODELING FOR AIR TOXICS COMPLIANCE WITH 401 KAR 63:020

Appendix A
SCREEN3 Modeling for Air Toxics Compliance

Procedural Summary

- Since multiple stacks and Insignificant Activities (i.e.: tanks, and other fugitives) exist, use of the U.S. EPA's Industrial Source Complex Short Term-3 (ISCST3) model would typically be required. However, a worst-case hypothetical emission situation was developed using only one emission point in order to allow the use of SCREEN3. Obviously, entering modeling data for only one point instead of many allowed the reviewer to expedite the modeling process, without sacrificing confidence in the results due to SCREEN3's conservativeness.

- For the hypothetical situation, source-wide emissions of all potentially hazardous pollutants listed on the POC table were assumed to "seep" fugitively from one tank. This hypothetical emissions scenario results in a very conservative modeling exercise because in reality most of the source's emissions are routed through the Thermal Oxidizer stack, which aids dispersion. Additionally, dimensions of the smallest height and diameter tank were entered into the model to ensure a maximum emission rate and increase the conservative nature of the modeling scenario.

- Modeled results were compared to the U.S. EPA's Reference Concentration (RfC) listed in the Integrated Risk Information System (IRIS) database. Since the IRIS RfC is "An estimate … of a continuous inhalation exposure to the human population … that is likely to be without an appreciable risk of deleterious effects during a lifetime," SCREEN3 output was converted to annual concentrations to allow comparison to the RfC. This was accomplished by multiplying by a conversion factor of 0.08.

- Modeling of the source's PTE for potentially hazardous pollutants produces annual concentrations less than the RfC (See the selected modeling output and table in Appendix B).

- The source's Conditional Major HAP limit 9.0 tpy of any single HAP was compared to its respective RfC as well. These resultant concentrations are also less than the RfC (See the selected modeling output and table in Appendix B).

APPENDIX B

RfC COMPARISON & SCREEN3 MODELING OUTPUT